A managed risk

A managed risk: Mediated musicianships in a networked laptop orchestra

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'Mediation' is perhaps one of the most powerful terms in contemporary music studies, but also among the most accommodating. While we can sometimes discern genealogical or conceptual convergences among its various analytical articulations, at the same time one of the term's most interesting features is its persistent multiplicity. It is eminently relational, but also slippery. Simply put, it defers questions of meaning and power in a present situation to subjects, objects, times, or places which may not be present – or at least not in precisely the same way.

In musicology, as well as in recent anthropologies of music and sound, the notion of mediation has served primarily as a way of drawing attention to the diverse social and material backgrounds that give a sense of agency and life to musical objects. Its applications are diverse, contested, and in no way limited to the examples I want to discuss here. This may in part be because, as Georgina Born (2005) has frequently emphasised for over two decades now, it is possible in principle to interpret *all* music as multiply mediated, and mediating, in relation to the various socialities and materialities that make it meaningful. Nevertheless, we still most often hear of mediation in discussions of musical assemblages where recording, transmission, or sound synthesis technologies play a central role. In the past, this tendency took on a strongly prescriptive tenor based on the idea that using such technologies constituted a break with or impediment to 'immediate', face-to-face communication (Sterne, 2003, pp. 20-22). The sense of threat may be gone, but the association with absence remains.

Although few would still agree that a conversation over the telephone is somehow less of a conversation than one around a café table, there is still a lingering sense that we can learn more about mediation from the former than from the latter. But mediation in Born's sense is clearly at work in both situations. We can think of the conversation as enacting a momentary bond across a heterogeneous assemblage made up, among other things, of bodies (voices, hands, faces), objects (tables, chairs, buildings, telecommunication devices, perhaps a bit of food or drink), and identities

(intimacies, acquaintances, ethnicities, professional roles, hierarchies of age, gender, or social status). Mediation, the drawing together of things that are otherwise separate, is in a sense what makes conversation possible at all.

My intention in bringing an optic of mediation to an ethnography of the emerging practice of the 'laptop orchestra' is twofold. First, I want to show that, even in a performance event rich with the kind of mediators that conform to the common-sense understanding of mediation as intercession (like the telephone), it is not helpful to divide things up into 'immediate' presences and 'mediated' absences. Presence and absence are equally mediated in this situation, and there is a critical sense in which this observation should extend even to idioms that feature far less technological density. Second, I want to argue that understanding the presences and absences that enliven the performance event in terms of mediation is not just analytically correct, but has an underlying political potential which provides strong motivation for hearing all music as mediated. To this end I will need to revive some aspects of a dialectical materialist reading of mediation which, although considered crucial in the last century, is often overlooked in contemporary music studies. My account weaves together observations and interviews conducted with a laptop ensemble at Concordia University in Montreal, Canada in 2011 and 2012, as well as research into the histories of electroacoustic teaching at the university, and of the laptop ensemble as an idiom.

'Welcome to our setup!'

Beginning in the Autumn of 2011 I spent several months working among students and instructors in the undergraduate electroacoustics course at Concordia University in Montreal. I came to my fieldwork interested in the role that digital technologies played in contemporary electroacoustic training and discipline. Electroacoustic technologies, and especially digital devices, are generally considered to favour individual engagement over group encounter. Michael Bull's accounts of iPod and Walkman listeners, for example, foreground the 'solitary' way in which they allow one to manage the monotony of modern life by constructing a 'privatised auditory bubble' (Bull, 2005, pp. 343-4). Personalization, deeply entangled with Western notions of liberal subjectivity, has been a prominent feature of the design of communication technologies since the beginning of the Cold War, and accordingly plays a large role in shaping creative practice in genres

that use these technologies (Novak, 2013, pp. 185-6; Turner 2013). The rhetoric of early electronic music similarly promised to give full control to the individual composer, eliminating the need for flawed performances and fussy interpreters (Théberge, 1997). Recently, and especially with the advent of networked mobile devices, efforts have emerged to make electroacoustic practice more 'social' by encouraging musicians to perform in ensembles. The spontaneous, co-present experience of playing with others is seen as amplifying the remaining traces of 'humanity' that electroacoustic music is normally understood to be lacking.

After two months of classroom observations and interviews with faculty members, then, I wasted no time answering an open call to join the course's new ensemble, the Concordia Laptop Orchestra, or CLOrk, which had been formed for the first time the previous semester as part of a year-long course in 'Live Electroacoustics'. The tone of the call was relaxed and inviting. Outside of the course, membership in the ensemble was informal. Students drifted in and out of rehearsals. There were no restrictions on experience or prior knowledge. Training was to be provided during rehearsal time. When I wrote to the instructor asking to get involved, he welcomed with open arms. My only task before joining in was to 'gear up'. The main requirements for participation were technological: a laptop, an external audio interface, and good quality cables to connect to the classroom sound system. I went to a local instrument shop and picked out an audio interface I had seen recommended on the course's internal email list. The sales clerk, a student himself, recognised me from his sound engineering class and gave me a discount.

We spent our first day of rehearsal plugging and unplugging equipment, installing software, loading sample libraries, establishing audio and video stream contact, and troubleshooting network connections. As the concert was also to be networked with ensembles in two remote locations – McMaster University, a six hour drive away in Ontario, and the University of Calgary, a couple of time zones away in Alberta – and recorded into a shared, multi-channel Digital Audio Workstation (DAW), the whole group needed to be connected to a central computer operating parallel chat, video streaming, audio routing, and recording software. Each musician's laptop also ran several parallel software processes. To start us off, the instructor circulated a simple program he had found on the internet that allowed individual samples to be assigned to each of the laptop's keys. Multiple instances of the program could be run at once, and we were to switch between them at his signal. Some of the players had also prepared sequences, recordings, or 'textures' using DAW software

environments such as Live or Logic. Others had designed synthesis processes to play with visual programming packages like Max or Pure Data. Most also spent part of the rehearsal time using their laptops to chat on Facebook, answer email, and surf advertisements for gear. For my part, I did all of this in addition to taking ethnographic notes using a journaling program I had recently started using at a colleague's recommendation. Machine and human agencies clamoured for attention. The social was back.

While malfunctions and incompatibilities did emerge from time to time, the overall mood was upbeat. Getting the machines and softwares to 'talk to each other' simply took time. A few hours into the session, however, the instructor began to apologise for spending so much time on troubleshooting and 'not really having much of a rehearsal'. The concert was only a few days away, but this was no concern. 'Friday is going to be very improvisational', he reassured us. 'The important thing is to be able to stop quickly'. About an hour before closing down for the day he had us play back some of the sounds we had prepared and demonstrated his conducting system. The system allowed him to indicate rudimentary dynamic changes, select players to perform solos or form subgroups, and call up prepared material from a shared sample library. After many plodding decrescendos it became clear to me that ensemble members could only achieve the dynamic variation he called for using the physical volume knobs of their sound interfaces or MIDI controllers. Our laptop screens were now teeming with swarms of software too unruly to be commanded in a single gesture. The instructor seemed used to this. Nothing was harder, he told us, than stopping a laptop orchestra.

The next day we had to arrive a few hours before the concert to resume the apparently endless process of setting up our gear. Organisers and technicians had arrived early in the morning to launch the concert's infrastructure. The computers connecting CLOrk with its remote improvisation partners served as a platform for audio, visual, and textual communication softwares running in parallel at each of the interconnected institutions. Among these were a high-bandwidth audio engine known as Jacktrip, which needed to stream and synchronize 48 channels of high resolution audio, multiple webcam video streams, a chat interface for conductor-to-conductor communication, and a handful of composition-specific 'score' interfaces distributing textual or graphical performance instructions to the musicians' screens. For the first and perhaps the only time in my fieldwork, I had the sense that I must be at what could be described as a 'cutting-edge', if

only because of the sheer accumulation of tentative and unpredictable mediations in play all at once. As each new component was imbricated into the system, it seemed a new malfunction would emerge somewhere else. Indeed, the troubleshooting continued until fifteen minutes after the scheduled beginning of the concert when, with network connections failing yet again, the instructor announced that we might as well go ahead locally whether the system was working or not. We silenced our software and he addressed the scattered audience with an ironic hint of apology: 'Welcome to our setup! Tonight you'll hear more setup than performing...'

The first time I spoke about my work with CLOrk to an audience of colleagues I illustrated my talk with a video recording taken from one of the group's performances. One audience member commented that the music sounded as if it could have been made with a single computer. Why, he asked, was there such a palpable disconnection between the level of technological engagement involved and the audible result? What musical justification could there be for assembling so many devices when you couldn't hear the difference between them?

Time spent planning, assembling and modifying instruments has become a central element of electroacoustic practice. Tinkering and reconfiguration practices now permeate every level of musical activity. In the broader field, entire courses and conferences are often delineated purely by technological domain.[1] In my conversations with students and staff at Concordia I found that people generally assessed this aspect of the process positively. Their laptops were not individual instruments so much as containers in which whole populations of instruments could be assembled and disassembled dynamically over the course of a single performance. Construction and troubleshooting spilled over into their free time. It was not uncommon for students to take real enjoyment in staying up late into the night building a new patch, experimenting with a new software environment, or trawling the web for solutions to nagging bugs. So why should the instructor have felt the need to apologise, even ironically, for the lack of 'performance' in such an obviously 'setup' focused event? Allowing more space for instrumental configuration in our understanding of the electroacoustic aesthetic certainly calls traditional divisions between instrument, concept, performance, and text into serious question (Born, 2011; Haworth, 2015; Charrieras and Mouillot, 2015). There are strong arguments for seeing the material units that afford electroacoustic practice not as instruments but as heterogeneous dispositives[2] in which writing, conceptualization, and sound-making are managed together. But there are also clearly critical points to be made – not least

from an ecological perspective (Berland, 2009, pp. 274-5; Devine, 2015) – about the way a networked laptop orchestra spins off such an alarming number of technological mediations, apparently without restraint, and for some listeners without appreciable effect.

Thus the present – or rather telepresent – event of laptop orchestra performance was saturated with technical invention, and much of it apparently near the edge of human control. Scratch the surface, however, and the performance's ethical and aesthetic limits returned.

Hidden perspectives

Historical, institutional, and disciplinary conditions complicate any effort to see the laptop orchestra's technological abundance as a sign of new aesthetic freedoms, and therefore demand deeper analysis. First I want to address the stated perception that there were 'no prerequisites' for induction into the ensemble's practice. The maintenance of this perception played an important role in the construction of CLOrk's performing style as immediate.

Most electroacoustics students at Concordia entered the course well-versed in the use of mobile computers, peripheral hardware, and virtual studio software. Almost every undergraduate lecture I attended during fieldwork at Concordia was delivered to a classroom full of students half-engrossed in gear advertisements, games, and Facebook chats. Few had grown up without computers and the internet as constant fixtures of everyday life. In fact it was a running joke that students could learn more on their own using sources on the Internet than they ever would from their professors. It was also rare for students to arrive completely untrained in music.

My observations generally aligned with instructors' estimates that around half of each cohort came to the course with the ability to read common practice notation. But the majority also had significant practical and professional experience for which it hadn't been necessary to learn notation at all. A few of the new students who I spoke with had taken extra steps to become familiar with electroacoustic genre convention before applying, whether by listening to faculty productions, or researching canonical composers from abroad. Some had gone so far as to consult with faculty members on what specific types of software and hardware to use in their entrance portfolios. Although none of these kinds of experience were listed among the admission requirements, it seemed to be common knowledge among the students that their aptitude for electroacoustics would

be tested via the portfolio they submitted with their application, and that there were certain reliable ways one could make such an aptitude apparent.

Faculty, however, frequently reported to me that it was their responsibility to reveal the errant preconceptions and misinterpretations in students' prior musical literacies. Students with advanced technical knowledge, for example, would be held back in other areas to ensure they had mastered certain rudiments before progressing. Students who had learned among friends or online needed a kind of retraining to achieve fluency in canonical standards. In spite of its essential role in classroom and homework assignments, the laptop was framed by faculty as an impediment to their task. Laptops have been controversial objects among academic electroacoustic composers since they first began to dominate performance practice in the late 1990s. Arriving in classrooms on the crest of a new wave of attention to embodiment and performativity that swept across the music disciplines as a whole (e.g. Small, 1998; Abbate, 2004), laptops appeared to break the intersubjective flow which composers were now told they should understand as the essence of ensemble playing. As CLOrk's director, Eldad Tsabary, put it to a newspaper interviewer towards the end of my fieldwork, arranging laptops into an orchestra was a response to crucial questions about imbuing them with the accepted values of spectacle and virtuosity: 'How do you make the audience feel like you're doing something when you're simply behind a laptop?' (La Leggia, 2012). Clearly three crucial prerequisites had been left unspoken: possession of the necessary hardware and software, a knowledge of the generic conventions that guided the way one's use of the hardware and software would be evaluated, and the ability to place those conventions in the foreground, and the hardware and software in the background. Only when following this third step could one be considered to be 'doing something' musically.

The management of immediacy extended to the ways students were expected to operate their laptops in performance. From the student's perspective the main challenge was the division of their attention between on-screen and off-screen interactions. As Nick Prior (2008, p. 912) has written, the laptop's design 'mediates mobility' – its screen and keyboard configure the flexible grasp and awareness of an ideal individual body in order to isolate its efforts and attentions from whatever situation it happens to be working in. The problem of movement and the separation of work from play have become mainstays of the critical and ethnographic literature on laptop performance (Emmerson, 2007; Montano, 2010). This separation is made even more complicated

by the fact that the screen is rarely exclusively devoted to the control of musical parameters, but instead functions as a window onto a virtual space in which multiple instruments, notifications, devices, and agents can operate simultaneously, with or without intervention from the user (Manovich, 2001, pp. 78-91). Following the conductor's indications made managing and restraining multiple software and hardware processes at once even more difficult. The visual engagement it took to operate screen-based controls slowed interpersonal responses. The telematic multi-site concerts that were CLOrk's mainstay during my fieldwork intensified this difficulty. There was no question among students that the idiom seemed to impede any chance of interpersonal interaction:

> It's not like when you jam and you look at each other, right? You kind of go into your own world, like if you're scared or if you're curious or if you're really lost in your head. You try not to overplay in that kind of stuff, when all those things start to descend on you. But in the end, like, when I'm having my best jams is when I'm looking you right in the eye and when we're really connecting. But with the laptop orchestra that's really difficult to do.

Conducting strategies only seemed to exacerbate this sense of thwarted agency. In building the group's repertoire, Tsabary had sought to maintain a delicate balance between composition and improvisation, which he presented as cultivating students' senses of responsibility to authority and individual creativity, respectively. Some performances were thus planned with graphic or text scores, either hidden in formats visible only to the conductor, or projected on a screen visible to both the performers and the audience. For these, Tsabary had adopted the term 'comprovisation', coined by a colleague to denote music that was individually conceived and authored, but collaboratively worked out (Bhagwati, 2008). The remainder of CLOrk's repertoire consisted of lengthy group improvisations, often based on material contributed by students. The line between the two idioms was blurred in a number of ways, however. Both were directed using a system of gestural indications known as 'Sound Painting' (Thompson, 2006), and from time to time both employed a software system, written and controlled by Tsabary, that synchronised students' sequencing software to a central 'clock'. Faculty members considered the inclusion of improvisation essential because they theorised it as re-admitting embodied expression and social interaction into the creative process, and thus increasing the immediacy and interpersonal communication afforded by laptop performance. In practice, however, improvisation often amounted simply to an ability to manage assigned material 'on the fly'. Another motivation was

that improvisation was clearly more efficient than composition. Plans could be decided upon, communicated to inexperienced newcomers, and tested with a minimum of rehearsal time, leaving more time for technical troubleshooting (Tsabary and Woolard, 2014; Tsabary 2016).

The immediacy promised by the new format was not some kind of return to participatory innocence generated by the micro-social interactions between the players. Rather it was product of the various constraints and disciplines applied to unwanted materialities. What a CLOrk performance seemed to foreground most of all was the possibility of being a musician *in spite* of the laptop and its affordances.

An analogous dilemma emerged around the range of aesthetic choices CLOrk mediated for students and faculty members. For faculty members, CLOrk represented a new openness to the various popular and dance genres they imagined their students as hailed by in the wider public sphere. Performances included 'beats' and 'loops', for example, materials ordinarily shunned in electroacoustic composition. And there was no denying that the strategy had its supporters. The fact that players experienced their creative agency as reined in by the technical and disciplinary conditions of the laptop orchestra did not necessarily prevent their enjoyment of playing in it. The students I interviewed appreciated the informality and accessibility of the format, and were unanimous in wanting to continue with CLOrk as they progressed in their studies. But they were hesitant to give the practice any aesthetic value. The highest compliment I heard from a student was that playing in CLOrk was 'dorky, but cute'. As they saw it, the main appeal of the course was the opportunity to hone technical skills. In the words of another first-year student:

> It's not an art program. You don't come in and start making art. It's not a music program, you don't come in and start making music and recording bands. It doesn't teach you anything about software, if that's what you're looking to learn. So you have to come in with all these things and sort of a desire to explore sound generally and broadly. And you develop a deep understanding of sound.

On the surface, the shift of emphasis from 'music' to 'sound' allowed the electroacoustic course to claim a kind of detached, tolerant aesthetic pluralism. As the department's founder Kevin Austin once put it in his opening remarks to a CLOrk concert, the course's scope was designed to encompass the entire range of musical expression involving electroacoustics. Electroacoustic

composers, because of their experience as pioneers, were uniquely positioned to 'speak for' the rapidly expanding field of genres they saw as their epigones. New ensemble idioms such as the laptop orchestra gave these genres a voice within the academe. At the same time, however, the extension of tolerance towards other voices seemed to be contingent upon their being able to speak to established electroacoustic theoretical concerns. As one of the older students described it, the principle of aesthetic 'openness' often acted as a sterilising force, establishing a laboratory-like situation where outside genres were not so much embraced for their differences as 'electroacousticised' in a sort of aesthetic vacuum. 'The problem with it in an institutional environment', he told me, 'Is that, I guess, it's something that already exists outside, and people are already doing it, and learning by doing it. And somehow in order to justify its own existence, the institution has to create its own special forms.'

Tacit checks on musical comportment complicated the achievement of this creative innocence. The strategy instructors had developed to steer new undergraduates' initiation into electroacoustic practice was a process that Austin described to me using the term 'cocooning'. Students were added to course email lists upon acceptance to the university, several months before the beginning of their first term, so that they could ask questions and start to establish social bonds. 'We have a really high bar, and a very narrow window of opportunity for a student to get into the program', another faculty member claimed, 'but once they are here we do everything we can for them.' This meant extending the social and aesthetic space of the classroom into other aspects of students' lives, keeping them engaged in their studies wherever their laptops and smartphones could go. Effectively, faculty members sought to weave students into a collectivity modelled along the lines of what Etienne Wenger (1998) has called a 'community of practice'. Maximising 'legitimate peripheral participation'—that is, setting up a situation in which students could learn from each others' examples both formally and informally—made it more likely that new players would be able to 'read between the lines' as instructors deemed necessary (Wenger, 1998, p. 11).

Far from being a straightforward response to technological and musical necessities, new idioms like the laptop orchestra worked to intensify the electroacoustic claim to authority, inoculating the genre against the increasingly sophisticated inventions that instructors saw it as having to absorb from imagined commercial others. Again, the result was a kind of selective immediacy. Just as presenting the laptop as an unresolvable lacuna within Western performance

conventions cleared away the unwanted resistance that might come with embracing its material affordances, presenting the aesthetic content of the course as an open field protected it from the risky incursion of difference that an embrace of actually existing dance idioms, for instance, could easily engender. In effect, CLOrk provided a ‘state of exception’, a suspension of the existing order put in place precisely to guarantee that order's continued existence (Agamben, 2005, p. 31). Managing the risk of delegitimisation gave instructors a scintillating sense of forging new paths in uncertain times.

Local pressures and wider disciplinary trends worked together to sustain this perception. To reiterate, when laptops first arrived in electroacoustic practice they were regarded with suspicion. On one hand, they represented the challenge of democratisation, the rise of an idealised ‘bedroom composer’ with no need for access to institutional authority (Eshun, 1999; Emmerson, 2001). On the other, they seemed to destroy the accepted relationship between musicians and their audiences, abstracting their actions from their sonic results, and sucking their attention into the screen. The invention of the laptop orchestra condensed electroacousticians’ hopes and controversies about mobile digital technologies into a concrete strategy for renewal. But it did not emerge organically from this apparent anomie.

In 2005, a group of software and hardware developers in the computer music program at Princeton University established PLOrk (Princeton Laptop Orchestra). As co-inventor Dan Trueman (2007) wrote in his first article introducing the project, the PLOrk model addressed four ways that the musical use of portable computers had undermined existing musical values. First, it broke the natural connection between music and bodily spectacle. Using a laptop could never be sufficiently expressive to be emotionally engaging to audiences with a taste for physical virtuosity. Second, it was far easier to master and more efficient to operate. Since little of what audiences might recognise as effort was required, the new equipment broke the standard channels for gaining expertise and literacy. Third, it had no ‘tradition’ or ‘performance practice’ to adhere to. And fourth, it fostered no inherent sense of ‘community’ among musicians. Laptop users had been deprived of the ‘magical’ aspects of playing together in large groups, and contributing to a coherent whole (Trueman, 2007, pp. 175-178). The particular genealogy of the mobile computer, combining business productivity with the consumption of entertainment, was identified as a contingency to be managed or overcome. Salvaging and revitalising elements of canonical performance models could

help academic experimenters remedy the confusion brought about by the new equipment. And this was a mission PLOrk's founders hoped to advance beyond their own institution. In 2008, Trueman and his colleagues were awarded large-scale funding from the MacArthur Foundation that would help them document the new idiom and disseminate it as a pedagogical model for other music departments. A series of commercial start-ups and extensions of the project to other mobile computing technologies ensued (Gopinath, 2013, pp. 101-126). By the time of my fieldwork the model had spread widely.

Although their papers place PLOrk within a genealogy extending back to the 'home brew' computing clubs of 1970s Silicon Valley, at first blush the norms of musicianship that Trueman and his colleagues put forward seems to have little in common with the neoliberal privileging of flexible, entrepreneurial self-management in a decentralised market that we now associate with the emergence of contemporary technocapitalism (Harvey, 2005; Ong, 2006; Turner, 2006). But neither is it a simple return to the Romantic model of the orchestra that Theodor Adorno (1976) once criticised as a microcosm of obedient social cohesion, in which productive forces are channelled and directed by a unifying symbolic authority figure. Deploying a rhetoric redolent of the early 'Web 2.0' evangelists – who walked a similar line between empowering customers to be entrepreneurs while at the same time centralizing technocratic authority 'in the cloud' (Fish, 2016) – the PLOrk project was most optimistic about the possibilities for 'participation' opened up by the new mobile devices. Readers of this journal will know that the participatory turn also has a history specific to music studies, where it grew from the efforts of reform-minded ethnographers like Charles Keil and Christopher Small (Hesmondhalgh, 2013, pp. 87-96). The conjunction of these discourses needs more analysis than I have space for here, but it was certainly felicitous for PLOrk's efforts to disseminate their invention. For an early-career academic like Tsabary, experiments in teaching and practice could also engender feelings of resistance to the 'safety' of established academic convention. As he told me when I asked about the attraction of the orchestra for students, 'I think it's because we're so flexible and we don't stick to what we see around us. Because we're in a university, and it's kind of a safe place in itself, it's our job to try things out, and not stick to the safe.'

This feeling of working against safety also dovetailed nicely with institutional narratives of revitalisation and experiment in relation to competing universities in the city. Concordia has the

largest undergraduate population in Montreal but consistently holds a lower academic ranking and more limited international profile than its research-oriented neighbours like McGill or Université de Montréal (Conférence des recteurs et des principaux des universités du Québec, 2006). Its marketing campaigns emphasise the dynamism, innovation and 'approachability' administrators hope to attach to its underdog positioning (Zack, 2006). This image is also projected upon Concordia from above by policymakers. In 1997, for example, Quebec's inter-university administrative council published an official agreement to 'reduce redundancy' between the province's music departments by dividing the distribution of degree and research offerings between them (Conférence des recteurs et des principaux des universités du Québec, 1997). According to the structure agreed at that time, existing graduate programmes in composition and musicology would continue to be supported only at universities with established research profiles like McGill and Université de Montréal. Primarily professional and undergraduate institutions such as Concordia, on the other hand, were to be excluded from the top tier of the research hierarchy, and instead encouraged to develop programs geared towards 'transgressing genres'. This negotiated state of non-competition made it effectively impossible for Concordia's electroacoustic department to aspire to anything like the engineering or compositional research prestige of their neighbours.

It did have research aspirations in other disciplines, however. Projects like CLOrk were particularly intertwined with internal strategies aimed at building Concordia's reputation as an international art and technology centre. Through the Hexagram Consortium, established in 2001, Concordia attracted unprecedented funding from public and private partners, which was then funnelled into a network of semi-independent research labs charged with generating 'technology transfer' opportunities in collaboration with local media companies like Ubisoft and Cirque du Soleil (Fourmentraux, 2007; 2011). Although the emphasis on private enterprise had waned in the decade following its foundation, Hexagram had attracted a fresh crop of foreign researchers to Concordia, and came to be recognised as one of the cornerstones of the university's international profile. Although the original inter-university partnership eventually folded, the spirit behind the project was still alive, and funding was redirected towards the task of breaking down disciplinary walls inside the university.

Established faculty members in the music department initially fought to keep electroacoustic teaching distinct from the new interdisciplinary audio and acoustics labs provided under the

umbrella of Hexagram. Only one faculty member from the music department had been involved in the initial proposals and planning in 2000 and 2001, and in her words, she had contributed 'mainly as an administrator'. For decades electroacoustic facilities had been located at a suburban campus several kilometres from the building housing the Hexagram laboratories in downtown Montreal. The distance had afforded faculty and students an ideal level of isolation, not just aesthetically and socially, but also in terms of production spaces and resources. The department held concerts in a separate facility designed by internal experts, kept specialized gear separate from Hexagram's interdisciplinary resource pools, isolated themselves as much as possible from administrative oversight, and tried to avoid direct confrontations with other departments. By the time of my fieldwork, however, and with a former Hexagram administrator at its head, the music department had begun to align itself with the ascendent regime. New courses – among them the Live Electroacoustics course which had acted as incubator for CLOrk – appeared in the undergraduate curriculum in order to encourage participation by non-electroacoustic students and to increase the 'transferrable' skills available to students on the course. Newly equipped classroom and studio facilities were built directly across the street from the main Hexagram offices, replacing older spaces at the ageing suburban campus. As the safety of the old cloistered environment melted away, projects like CLOrk provided a microcosm of the aesthetic and technical authority the department now struggled to maintain.

Mediation as critical intervention

The laptop orchestra's complex play of presence and absence goes far beyond the range of materialities and socialities that we normally think of when we describe a musical object in terms of its mediation. This of course raises legitimate questions about the sources and limitations of the concept's relational and explanatory power. Indeed, the problem is amplified by the fact that the aesthetic and social goals of new idioms like the laptop orchestra are contested and as yet open to revision. Is it possible to construct a definition of mediation that provides reasonable constraints, while also leaving differences and contingencies in tact?

I begin with the common sense notion and work forward. In their work on digital technologies in contemporary popular music, Anne Danielsen and her colleagues offer an account

of mediation as a means of accessing the 'materiality' of a recording or broadcasting medium through accents placed by musicians on its audible artefacts (Danielsen & Maasø, 2009; Brøvig-Hanssen & Danielsen, 2016). Defined in this way, mediation is reduced to the intercession of material contingencies in transmissions of meaningful musical sound. The analytical frame is limited to the way music works for listeners as a play of signs, and thus attention to mediation becomes a matter of whether the resulting musical text tells us 'lies' or 'truths' about the nature of the material signifiers underlying it (Danielsen & Maasø, 2009, p. 138). An extension to this approach emerges in critiques that focus on the comparative 'fidelity' of different recording media. Eric Rothenbuhler and John Durham Peters (1997), for example, once argued not simply that analogue vinyl discs can sound different than digital compact discs – a point with which Danielsen would certainly agree – but that something about their particular materiality gives them a more direct semiotic connection to the historical and social worlds they inhabit. This conclusion draws criticism for its lack of attention to the role of historically situated cultural practice in shaping media materialities (Sterne 2006; Born 2009). It seems to slide from simply describing the way signs can be embodied in technological objects to a kind of phonographic essentialism, in which the meanings associated with those objects by convention coalesce into fixed values with no room for reinterpretation.

We can advance past this phonographic essentialism by picking up terms from Danielsen that emphasise the relational conditions under which mediation becomes salient. For a listener unfamiliar with the historical, generic, or technological conditions around a particular recording, the properties by which it mediates these backgrounds are transparent: they may just as well have been personal choices on the part of the author, and thus can be more easily heard in relation to the listener's immediate concerns. For a listener immersed in the particular genre or instrumental practice that gives rise to a recording, however, such fine distinctions become 'opaque': they may refer the listener to other musical or technological repertoires, or they may open up imagined worlds populated with publics to which the listener feels some affinity. In a sense, the objects in which we can perceive mediation as 'opaque' become for us what Alfred Gell has called 'indexes of agency' (Gell, 1992). This is precisely the situation in which musical objects can be said to, in Born's words, 'condense or embody social relations […] by spinning forms of connectedness across time and space' (Born, 2005, p. 16). Historically and culturally embedded reception plays a decisive and

activating role in this process. Without this third stage – external to the object and its potential significations – mediation is incomplete.

In the pragmatist logic of Charles S. Peirce, 'mediation' appears as the semiotic operation proper to 'thirdness', the category of signs in which an 'interpretant' brings two terms into a synthetic relationship with each other. Whereas iconic (first) and indexical (second) significations govern direct mimetic and causal relationships, respectively, mediation presupposes an interpretive agent informed by a background of convention, language, and culture (Peirce 1998; Turino, 1999, pp. 231–232). As Louise Meintjes writes, '[m]ediation transfers meaning from one kind of interpretive domain to another. […] Signs are inherently unstable because they exist in the context of other polysemic signs. Chains of semiosis set multiple possible pathways of inference in motion' (Meintjes, 2003, p. 259). From an analytical point of view this definition gives empirical inquiry an essential role in the understanding of how mediation works in a particular object or event. Without the necessary cultural and historical perspective the interpretive pathways to external agencies and social relations collapse into the object at hand. From a productive point of view it also makes mediation a powerful political tool. Meintjes continues, 'Mediation embeds layers and layers of experience in the expressive commodity form and it opens up multiple possibilities for interpretation of those embedded experiences. […] It is in the convergence of these forms of mediation that social difference is produced and variously made powerful' (Meintjes, 2003, p. 261).

While perspective-taking may be important here, there is more to mediation than simple situated interpretation. Understanding social and material relations as mediated is a political decision. We can reason this out by following the fold between Peirce's Hegelianism and the dialectical materialism of Marxist critical theory (see also Grusin, 2015). Mediation in this regard is on the one hand a mode of entanglement between musical technique and the material forces of production (Middleton, 1990, p. 90; Paddison, 1993, pp. 124–126). To identify a musical object as mediating in this sense is simply to say that it 'triangulates' a relationship between material processes (Witkin, 2003, pp. 177–178). On the other it provides a means of strategic interconnection that the critic can use to disclose class struggle. Seeing events, objects, and subjects not merely as the stuff of immediate perception but as *mediated*—that is, as embodying contingent relations that integrate them into a shared social and material totality—provides the critic with an empirical basis upon which to identify the possibility of historical change (Lukács, 1971, pp. 154–

168). Frederick Jameson highlights the discontinuity that makes this interpretative standpoint possible:

> If a more modern characterization of mediation is wanted, we will say that this operation is understood as a process of *transcoding*: as the invention of a set of terms, the strategic choice of a particular code or language, such that the same terminology can be used to analyse and articulate two quite distinct types of objects or 'texts', or two very different structural levels of reality. (Jameson, 1981, p. 40)

As Jameson goes on, however, 'the distinguishing of two phenomena from each other, their structural separation, the affirmation that they are not the same, and that in quite specific and determinate ways, is also a form of mediation' (Jameson, 1981, pp. 41–42). Mediation is thus not simply about recognising the social relations entailed in a musical object or event in the present; breaks, absences, and externalities play an equally important role. This is precisely the standpoint from which Born has argued against the tendency to limit the analytics of mediation to 'micro-sociologies'. For Born it is imperative that empirical attention be oriented towards the wider political and institutional forces that structure power relations in musical practices. 'A fundamental theoretical question arising from these approaches', she asserts, 'is how to move beyond the tendency […] to take the observable micro-social patterns of musical experience and behaviour as the privileged locus for an analysis of musical meaning, and as amounting to the entire socio-musical reality.' (Born, 2005, p. 14)

She expands music's mediated socialities into four categories or 'planes', all of which must be considered, Born claims, if a holistic account is to be taken of the dynamic workings of musical objects and practices (Born, 2012, pp. 266–267). More recently, she has made similar efforts to tease out the ramifications of music's mediated temporalities as well. In this she goes beyond the mere unfolding of musical time in immediate social experience to explore 'the dynamics of retention and protention proffered by the musical object', the temporality of genres as 'objects distributed in time' with their 'characteristic metarhythms of repetition and difference', and finally the various 'encultured ways of living and conceiving time' within which musical experience is organised by particular groups of listeners (Born, 2015, pp. 372-374). The point of multiplying these temporal orders, for Born, is to 'open out these differences and their historical effects, avoiding their reduction to an unquestioned unity' (Born, 2015, p. 375).

Attention to mediation is thus not simply an attention to the agency and materiality of 'nonhuman' actors; it must also track differences in the way these agencies are managed, cultivated, or restrained. Thus Benjamin Piekut (2014, p. 196) has argued in favour of moving away from a narrow 'proprietary' model of agency, in which agency is possessed only by those with 'intentions', and thus capable of ethical and moral judgment. Piekut's alternative is to reverse the imputation and describe agency as the observable 'effect' of 'an action or an event'. 'If something makes a difference', he goes on, 'then it is an actor.' (Piekut, 2014, p. 196) Treating agency as epiphenomenal in this sense makes its presence or absence a matter of empirical inquiry rather than theoretical speculation. It also allows the observer to describe objects, collectives, ideas, or even musical works as agents, and even retains a role for the human-specific imputation of motivations and goals. But the question of which of these things 'makes a difference' in the present situation always brings questions of perspective, power, and scale into play. Expanding our understanding of mediation to include both the object and the act of interpretation places contingency at the centre of our understanding of the way agencies coalesce into a larger totality. As Anna Tsing (2010, p. 50) reminds us, the projection of larger social and historical wholes offers 'guides both for and against disorientation'. This forces us to see mediation not just as a 'form of nonlinear, relational causality, a movement from one set of relations to another' (Sterne, 2012, p. 9), but also as providing the means to enact the critical cuts necessary for political change. Attention to mediation is therefore not just more accurate form of analysis; it is a necessary critical intervention. Without mediation, in fact, no action *could* make a difference.

Conclusion

My ethnography of CLOrk highlights the political inadequacy of defining mediation simply as a form of passage or intercession between perceiver and signification. The present, material properties of networked mobile computing technologies are part of the way these performances play out, but these properties are not sufficient by themselves to explain the politics that animate the event. More worryingly, the discursive and disciplinary strategies involved in the invention and continued dissemination of the new idiom actively mitigate against viewing it as anything but a co-present assemblage of individuals and machines. The foregrounding of action and innovation is essential to the role the laptop orchestra plays in adapting electroacoustic education to a dynamic,

flexible neoliberal order. As I have shown, however, this has been achieved through an amplification of sedimented conventions around what makes musical performance meaningful. Instead of providing an opening outwards, the laptop orchestra functions as a controlled environment where difference can be flattened into agreement. No amount of looping and improvising – no addition of genres, bodies, or instruments – could work against the absenting of history and politics this function entails. A critical account of the practice demands an understanding of the things it lacks or excludes. If I want to imagine, or indeed actualize alternatives to the neoliberal model of electroacoustic education, my responsibility is not to resolve these elements, but to show how they work together as a discontinuous constellation. Thus, as Ilana Gershon has argued, since neoliberal policy is so flexible in its incorporation of indigenous claims to value and meaning, localism is an important but insufficient critique. A critical anthropology of neoliberal formations must place stress on the contradictions of scale, power, and morality that structure even the most 'levelled' subjectivities and socialities (Gershon, 2011, 546-547).

Mediation, therefore, provides both a means of describing the organic relations inherent in material and social forms, and also a powerful political tool for enacting critical changes in the existing order. To attend to mediation is to hold on to the possibility of resistance itself, especially under conditions where agency is forcibly collapsed into the local present. A mediated musicianship is not just a negotiated settlement between subjects and objects, it is the chance to imagine that settlement anew.

Notes

1. I am thinking, for example, of such gatherings as International Computer Music Conference, New Interfaces for Musical Expression, or Linux Audio Conference. It is still not uncommon for an academic electroacoustic composer's entire written output to consist of engineering papers.

2. Incidentally, *dispositif* was the word that the francophone musicians I worked with during my fieldwork in Montreal used in place of the English term 'setup' to describe the assemblages of devices they used to make their music. By using it here I also hope to highlight the correspondence with Michel Foucault's (1976) term describing the social-material knowledge structures that govern flows of power, which will certainly be more familiar to anglophone readers. See also Agamben

(2009, pp. 2-3).

3. Born's (2010, p. 221) use of the concept of the 'constitutive outside' does similar critical work.

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